User Manual
Pump In Sub

This Manual Covers the Following Part Numbers:

165-3205-HV0
165-3878-HV0

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Revision History

Issue, Release Date	Description
Rev A, 27 Oct 10	Initial Issue
Rev B, 06 Feb 11	Addition of Pump in Sub 165-3878-HV0
Rev C, 21-Aug-12	General review and corrections

Safety

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

All pressure equipment has a particular pressure rating and care must be taken to ensure that no item is used in a situation that may cause its working pressure to be exceeded.

All personnel involved in pressure testing must be formally trained, competent and utilising the appropriate PPE.

Ensure the identification band/plate is fitted and is displaying the correct information as per the Tag Sheet/Index

This equipment and the equipment it is attached to is heavy never position yourself below a suspended load

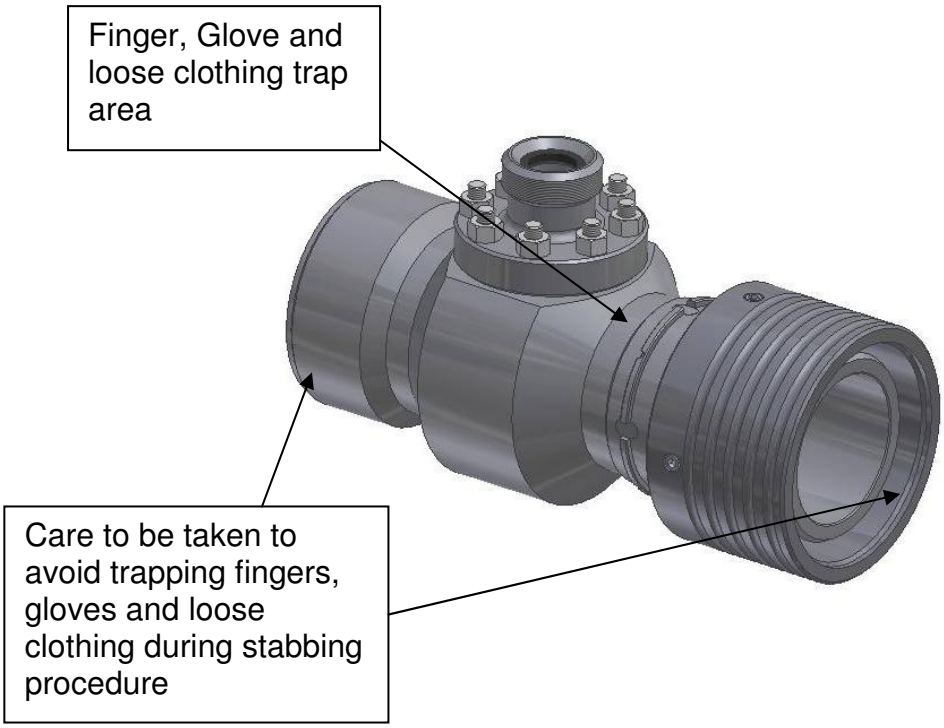

Finger, Glove and loose clothing trap area
Care to be taken to avoid trapping fingers, gloves and loose clothing during stabbing procedure

Figure 1: Pump in Sub Safety

1 Introduction

1.1 General

The pump in sub is normally positioned between the wireline valve and the wellhead. Its main function is to facilitate well control by pumping fluid when the wireline valve is closed.

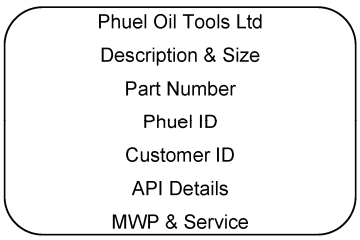
The Phuel pump in sub body is constructed in one piece. The side outlet sub has a standard API BX flange that allows the fitting of a x-over with suitable flow connections (2" hammer lug union in this case) to be attached. The end connections are Otis type with the Phuel safe-lok features incorporated as standard.

This user manual serves as an introduction to the equipment and contains the relevant specifications, operation, planning and maintenance instructions, parts list and drawings.

1.2 Product Identification

Phuel products are identified by a unique serial number that facilitates full product traceability. Each product is supplied with a documentation pack that contains product certification and material/inspection reports. The serial number is always etched on the surface of the product but can sometimes be difficult to find or read after painting. A customer identification number is also included to allow the customer to track the asset in their system.

A stainless steel band secures the nameplate tag that is stamped with the information shown below. This tag should be located in the first instance to ensure that this manual refers to the correct equipment.



2 Technical Specifications

Part No	**165-3205-HV0**	**165-3878-HV0**
Connections	9 ½'' – 4 Connection 2'' 1502 VECO	11 ½'' – 4 Connection 2'' 1502 VECO
Flange Connection	2-1/16" 10M	2-1/16" 10M
Maximum Working Pressure	6,500 Psi	10,000 Psi
Service	H2S	H2S
Weight	303 lbs/137 Kg	483 lbs/219 Kg
Make Up Length	22.00" / 0.56m	25.11" / 0.64m
Recommended Flange Torque	200lbft (270NM)	200lbft (270NM)

Table 1: Technical Data

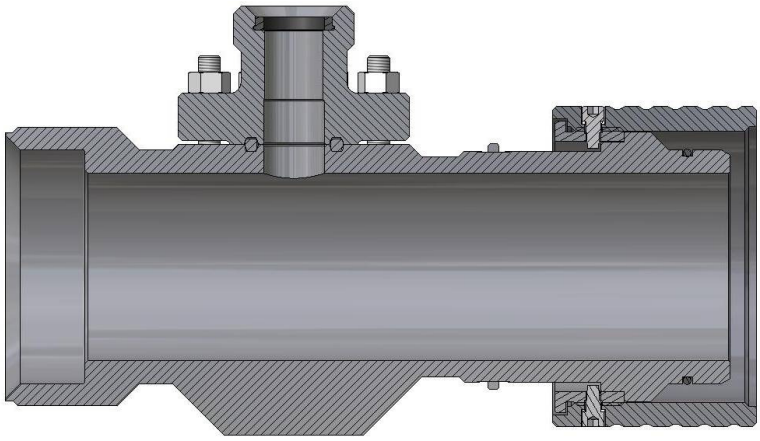


Figure 2: Pump in Sub

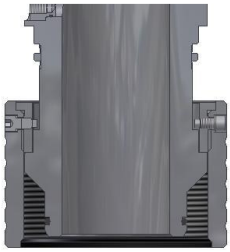
3 Technical Description

3.1 Collar Safe-Lok

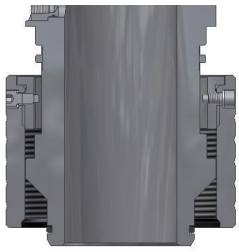
The safe collar lock is designed to provide safe handling of the union collars, and improves inspection and redress of the pin connection seals. The following shows the sequence for correct operation.

3.1.1 Preparing the Safe-Lok Collar

After removing the thread protector the collar will be set in the lower position and must be moved to the high position before making up the connection.



With both hands raise the collar ensuring the Stop Pins go through the gaps in the raised shoulder

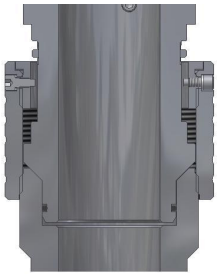


Rotate the collar through 45° and gently lower onto the raised rim. Ensure collar rests into the grooved area

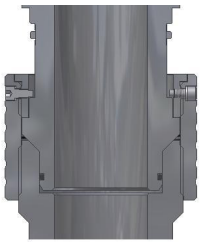
3.1.2 Making up the Safe-Lok Collar

Lift and stab the pin into the mating box and check that there are no signs of damage to the o-ring (caused by being misaligned while stabbing in).

With both hands raise the collar clear of the grooved area on the raised rim and rotate through 45°. Lower the collar until it reaches the top of the threads. Turn the collar anticlockwise until the start of the thread is found and then start turning clockwise to make up the collar to the box thread.

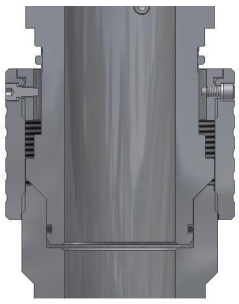


Tighten the collar down.

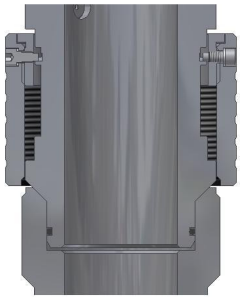


3.1.3 Breaking the Safe-Lok Collar

Unscrew the collar completely



Lift the collar up, ensure the stop pins go through the gaps in the raised rim. Rotate the collar 45° and lower gently so that the pins rest in the grooved portion of the raised shoulder.



The connection can now be separated without any risk of dropping the collar.

3.2 Flange Crossover

The side outlet sub is a standard API BX flange that allows suitable flow connections (2” 1502 Hammer Lug Union in this case) to be attached

Figure 3:Flange Crossover

4 Operation

All operations to be carried out by suitably qualified and competent personnel

Once the relevant valve has been connected to the 1502 connection the pump in sub is ready for connection between the wireline valve and the wellhead to allow well control

The pump in sub can also be utilised to allow fluid sampling and/or inhibitor injection.

4.1 Pre Job

- Ensure thread protectors are fitted
- Check maintenance record sheet and ensure the equipment has been maintained by competent personnel
- Check all certification is in date
- Confirm information band is fitted and correct
- Ensure equipment is suitable for the maximum working pressures and services involved
- Ensure 'O' ring is seated correctly and there are no signs of damage
- Ensure threads are clean
- Inspect for signs of damage
- Pressure test at least to 1.2x the maximum well pressure
- Carry out a collar lock test and ensure correct operation
- Ensure all connections are tight and that the test port is tightly fitted

4.2 During Job

- Ensure collar lock has operated correctly and the collar is locked in position
- Avoid excessive movement

4.3 Post Job

- Inspect for signs of damage
- Ensure threads are clean
- Ensure thread protectors are fitted

5 Maintenance

All maintenance to be carried out by suitably qualified and competent personnel

5.1 Introduction

Regular maintenance of the equipment using Phuel redress kits or Phuel approved parts is essential to its continued safe operation. Ensure that the pre and post job operating procedures are followed and that maintenance records are kept.

5.2 Schedule

The maintenance schedule may be governed by international or company standards and the following is considered to be the minimum requirements.

5.2.1 Pre & Post Job

Refer to Section 4.1 and Section 4.3 for details

5.2.2 Yearly

- Inspect the condition of all sealing surfaces and surface coatings
- Re-coat threads and sealing surfaces if necessary. If in doubt contact Phuel Oil Tools Ltd
- Replace all elastomeric seals with items from redress kit (see spares)
- Regrease components
- Re-assemble (see below)
- Pressure test to maximum working pressure
- Inspect paint work and repair as necessary

5.2.3 Five Yearly

- Return to Phuel Oil Tools for re-certification in accordance with DNV-OS-E-101

5.3 Redress Procedure

5.3.1 Dis-Assembly

- Remove 4 Stop Pins and washers from the split collar
- Loosen split rings from collar and remove from split collar. Remove split collar from bottom sub
- Remove hex nuts
- Remove flange crossover and seals
- Remove studs from the side flange
- Remove and discard ‘O’ rings from bottom sub
- Degrease and clean all components
- Inspect threads for damage
- Fit thread protectors

5.3.2 Re-Assembly

- Remove thread protectors
- Inspect all threads for signs of damage and clean with wire brush
- Slide the Split Collar over the bottom sub, make up the two halves of the split ring and tighten down until the ends are flush with the collar. Back off slightly to align the holes
- Insert 4 Stop Pins and washers.
- Fit ‘O’ rings to the bottom sub
- Insert studs fully into the body and tighten by hand
- Fit the BX seal to the groove and retain with some grease
- Fit flange crossover to flange sub (ensure bottom seal correctly positioned) and tighten down into place with hex nut to a recommended torque of 200lbft (270NM)

5.4 Maintenance Record Sheet

Date Performed	Type of Maintenance	Performed By	Verified By	Comments

Example

Table 2: Maintenance Record

6 Testing

All testing is to be carried out in the designated test area and by suitably qualified and competent personnel.

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

- On completion of reassembly fit the appropriate test caps to either end of the pump in sub and to flange crossover
- Fill with test fluid and bleed off any air in the system
- Apply a pressure of 500 psi and ensure pressure holds for a minimum of 10 minutes
- Increase pressure to Maximum Working Pressure, allow to stabilise and maintain this pressure for 15 minutes with no visible leaks. (Testing to be carried out to Test pressure when decreed by maintenance schedule)
- Bleed off pressure, drain test fluid and dry
- Remove test caps
- Apply coating of de-watering solution to protect the bore and threads
- Fit thread protectors

On completion of all maintenance ensure the maintenance record sheet (Para 5.4) is completed

7 Parts List and Drawings

Item Number	Part Number	Quantity	Description
1	165-3206-480	1	PUMP IN SUB 9-1/2 B X P
2	117-2381-480	1	SPLIT COLLAR 9 1/2 -4 (SPLIT TYPE)
3	117-2382-480	1	SPLIT RING (9.5-4)
4	950-2160-480	1	FLANGE CROSSOVER (ANSON)
5	110-3147-3A4	4	STOP PIN FOR 9.5 SPLIT COLLAR
6	WNL-0580-316	4	WASHER NORDLOCK (M12)
7	801-0443-V90	1	O-Ring - B.S Size 443
8	950-2167-N90	1	SEAL FOR FIG 1502 (ANSON)
9	HNC-0670-A2H	8	HEX NUT 3/4 UNC
10	950-2164-STL	1	API SEAL BX 152
11	165-2165-AB7	8	STUD 3/4-10 UN X 3.75 LONG
100	910-3540-N66	1	FEMALE PROTECTOR 9-1/2
101	910-3539-N66	1	MALE PROTECTOR 9-1/2

Table 3: Parts List 165-3205-HV0

Note: Thread protectors not shown on Assembly Drawing Figure 4

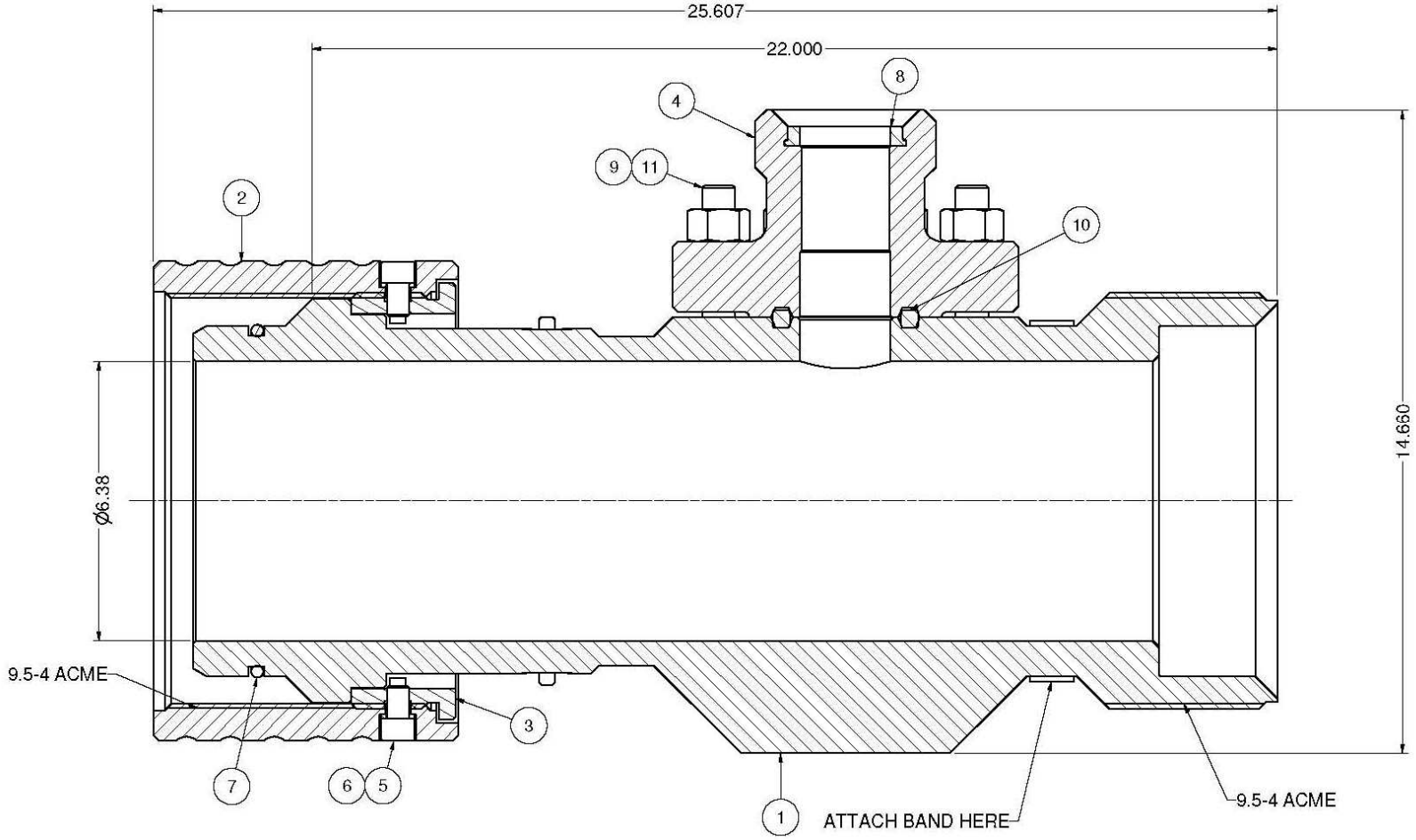


Figure 4: Assembly Drawing 165-3205

Item Number	Part Number	Quantity	Description
1	165-3879-480	1	PUMP IN SUB 11.5 B X P (6-5/8" ID)
2	110-2546-480	1	SPLIT COLLAR 11.5-4
3	110-2547-480	1	SPLIT RING (11.5-4)
4	950-2160-480	1	FLANGE CROSSOVER (ANSON)
5	110-2548-3A4	4	STOP PIN (1.25 LONG)
6	WNL-0580-316	4	WASHER NORDLOCK (M12)
7	801-0444-V90	1	O-Ring - B.S Size 444
8	HNC-0670-A2H	8	HEX NUT 3/4 UNC
9	950-2164-STL	1	API SEAL BX 152
10	165-2165-AB7	8	STUD 3/4-10 UN X 3.75 LONG
100	910-3620-N66	1	DW MALE PROTECTOR 11 1/2
101	910-3621-N66	1	DW FEMALE PROTECTOR 11-1/2

Table 4: Parts List 165-3878-HV0

Note: Thread protectors not shown on Assembly Drawing Figure 4

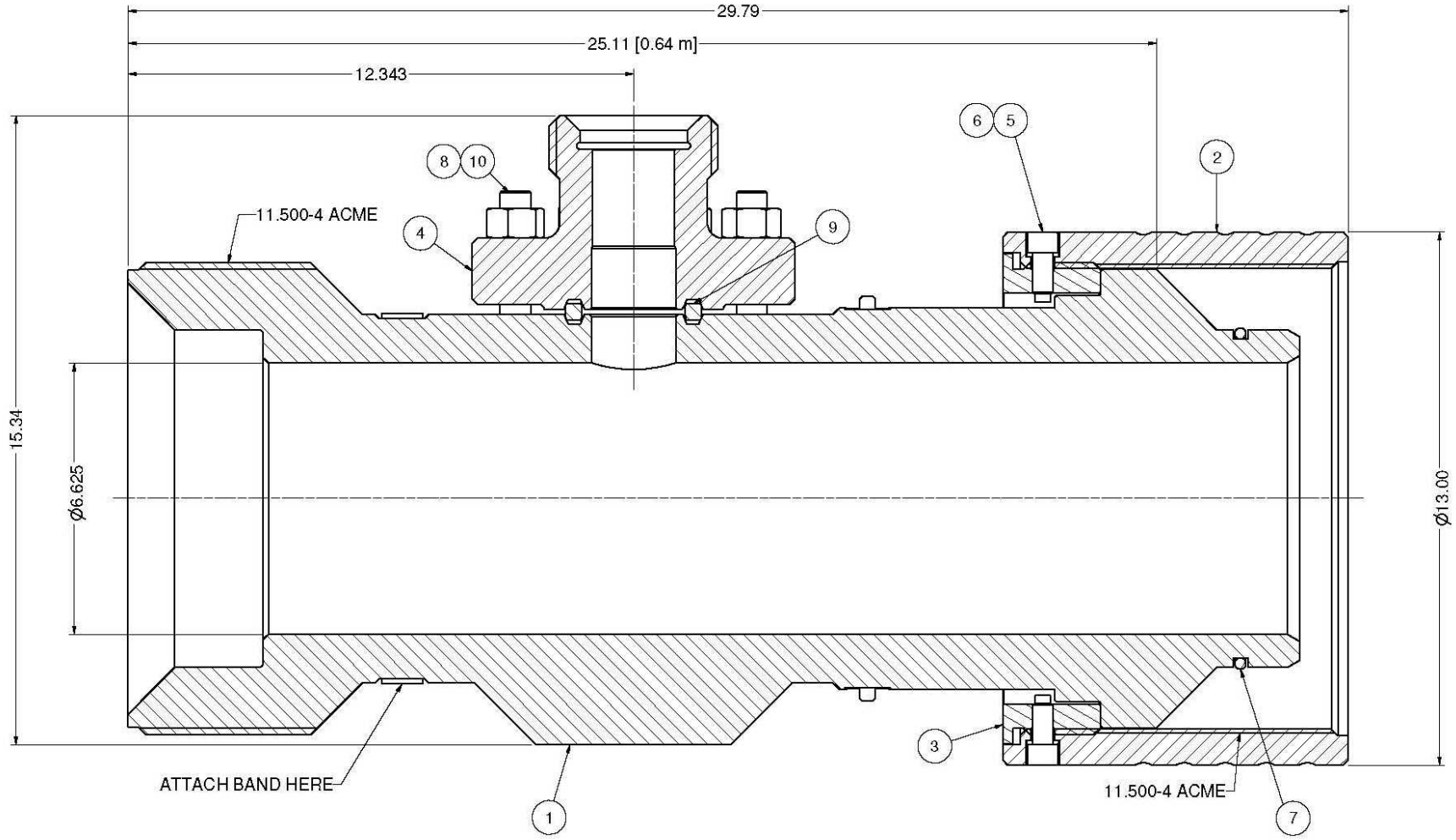


Figure 5: Assembly Drawing 165-3878

8 Spares

Use only spares supplied or approved by Phuel Oil Tools Ltd.

It is recommended that sufficient quantities of the o-rings be maintained to ensure that the equipment is always available when required.

Elastomeric spares are supplied in Viton material as standard. Many other materials are available please specify when ordering.

Note: O-Rings conform to industry standards and may be substituted with those from other suppliers -– **at the sole risk of the user**.

8.1.1 Individual Items

Individual items may be ordered as required using the part number specified